

REMARKS

Claims 3, 4, 9, and 11 are pending in this application. By this Amendment, claim 10 has been canceled and claims 3, 4, 9, and 11 have been amended. Support for the amendment to claim 11 is found in original claim 1, for example. Support for the amendments to claim 9 are found in original claims 1 and 2, for example. No new matter has been added by this Amendment.

Entry of the Amendment is proper under 37 CFR §1.116 since the Amendment: (a) places the application in condition for allowance (for the reasons discussed herein); (b) does not raise any new issue requiring further search and/or consideration (since the Amendment focuses on issues previously discussed throughout prosecution); (c) does not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) places the application in better form for appeal, should an appeal be necessary. The claim amendments are necessary and were not earlier presented because they are made in response to arguments raised in the Final Rejection. Entry of the Amendment is thus respectfully requested.

I. Rejection under 35 U.S.C. §112, second paragraph

Claims 3, 4, and 9 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Applicant respectfully traverses the rejection.

The Examiner stated that claim 9 does not positively recite the base material and thus, claims 3, 4, and 9 are indefinite. In addition, the Examiner stated that, in claim 9, it is not clear "which plurality of first coating layer consists of the . . . compounds" and thus, claims 3, 4, and 9 are indefinite (Office Action, page 2).

Regarding the base material, without acquiescing in the propriety of the rejection, but solely to expedite prosecution, the phrase "base material" has been moved from the preamble into the body of claim 9 and thus, the base material is positively recited.

Regarding the plurality of first coating layers, without acquiescing in the propriety of the rejection, but solely to expedite prosecution, claim 9 has been amended to clarify that *each* first coating layer present in the hard multilayer coating consists of $(\text{Ti}_x \text{Al}_{1-x}) (\text{C}_y \text{N}_{1-y})$, wherein $0.20 \leq x \leq 0.60$, $0 \leq y \leq 0.5$.

Applicant respectfully requests reconsideration and withdrawal of the rejection.

II. Rejection under 35 U.S.C. §102(e)

Claim 11 is rejected under 35 U.S.C. §102(e) as being anticipated by Brandle et al. (U.S. Patent No. 6,492,011) ("Brandle"). Applicant respectfully traverses the rejection.

The Examiner stated that Brandle discloses "the claimed alternating coating with the claimed components and thickness" (Office Action, page 3). According to the Examiner, Brandle discloses "an overlap in the claimed materials and thus includes the claimed components for said second coating" (Office Action, page 3).

In order for a reference to anticipate a claim, the reference must teach every element in the claim. Brandle describes a multilayer coating including a first coating layer (element 5), i.e., a hard layer, a second coating layer (element 3), i.e., a softer intermediate layer, and an optional third layer (element 7), i.e., a soft metal layer (Figure 1).

The Brandle first coating layer (element 5) constitutes an outermost layer of the coating. The first coating layer has a relatively high degree of hardness and is at least one of the following materials: (1) nitride of titanium and aluminum, (2) carbonitride of titanium and aluminum, (3) carbonitroxide of titanium and aluminum, (4) nitroboride of titanium and aluminum, or (5) carbonitroboride of titanium and aluminum.

The Brandle second coating layer (element 3) has a relatively low degree of hardness and predominately consists of at least one of the following materials: (1) nitroboride of at least one of chromium, tantalum, zirconium, and titanium, (2) carbonitroboride of at least one of chromium, tantalum, zirconium, and titanium, (3) carbonitrooxide of at least one of chromium, tantalum, zirconium, and titanium, (4) nitride of at least one of chromium, tantalum, and zirconium, or (5) carbonitride of at least one of chromium, tantalum, and zirconium.

The optional third layer (element 7) is at least one of the following soft metals: chromium, tantalum, titanium, or zirconium.

In contrast to Brandle, the claimed multilayer coating of claim 11 comprises first and second coating layers, wherein each first coating layer consists of $(\text{Ti}_x \text{Al}_{1-x}) (\text{C}_y \text{N}_{1-y})$, wherein $0.20 \leq x \leq 0.60$, $0 \leq y \leq 0.5$, and each second coating layer includes CrN and $(\text{Ti}_x \text{Al}_{1-x}) (\text{C}_y \text{N}_{1-y})$, wherein $0.20 \leq x \leq 0.60$, $0 \leq y \leq 0.5$. Neither Brandle's second layer nor the optional third layer, alone or in combination, includes the components of the second coating layer in claim 11 and thus, there is no "overlap" in materials as asserted by the Examiner. Since Brandle does not teach a hard multilayer coating comprising each and every element of the coating as claimed in claim 11, Brandle cannot anticipate claim 11.

Applicant respectfully requests reconsideration and withdrawal of the rejection.

III. Rejection under 35 U.S.C. §103(a)

Claims 3, 4, and 9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Setoyama et al. (U.S. Patent No. 5,503,912) ("Setoyama") or Kukino et al. (U.S. Patent No. 5,882,777) ("Kukino") in view of Brandle et al. (U.S. Patent No. 6,492,011) ("Brandle"). Applicant respectfully traverses the rejection.

The Examiner characterized Setoyama and Kukino as disclosing alternating coatings on a substrate, wherein the coatings may include CrN and TiAlN (Office Action, page 3).

The Examiner concluded that it would have been obvious to one of ordinary skill in the art at the time of the invention to alternate between CrN and TiAlN and overlap these components in view of Brandle, which discloses that when CrN and TiAlN are present, "they may be overlapped to improve adherence" (Office Action, pages 3-4, bridging paragraph).

In order to render the claims *prima facie* obvious, there must be an incentive, suggestion, or motivation in the art to make the recited combination of references, and there must be a reasonable expectation of success in obtaining the claimed invention based on the recited combination of references. Neither Setoyama nor Kukino disclose the components of claims 3, 4, and 9, and Brandle fails to remedy the defects of Setoyama and Kukino as discussed below.

Setoyama teaches the formation of a laminate comprising alternating layers which form a cubic crystal structure. Layer (a) is a metallic bonding compound having a cubic crystal structure and is at least one nitride or carbonitride of at least one element from Groups IVa, Va, and VIa, Al, and B. Layer (b) is a covalent compound having a crystal structure other than a cubic system. The two alternating layers (a) and (b) form an overall cubic crystal structure.

Kukino teaches the formation of a "super hard composite material" comprising a film consisting of "super thin films (a) and (b) each deposited alternatively on the substrate" (abstract). The two alternating layers (a) (cubic crystalline metallic bonding compound of at least one nitride or carbonitride of at least one element from Groups IVb, Vb, and VIb, Al, and B) and (b) (covalent compound having a crystal structure other than a cubic system) form an overall cubic crystal structure.

The Setoyama and Kukino cubic crystal structure laminates are formed on substrates that are optionally coated with an intermediate layer. There is no indication in Setoyama or Kukino that one of ordinary skill in the art could create a multilayer coating using the

components of claims 3, 4, and 9, especially in view of the presence of Cr in the second coating layer in the claimed multilayer coating since Cr has a *cubic* structure at 25°C and 1 atm.

To remedy the defects of the primary references, the Examiner cited Brandle as teaching that one of ordinary skill in the art would have known to alternate between CrN and TiAlN to improve adhesion. However, Brandle does not provide such a teaching. Brandle only discloses improved adherence of a hard layer to a substrate by inserting a soft layer or soft metal in between the hard layer and the substrate. This alleged benefit disclosed by Brandle is not applicable to Setoyama and Kukino since the two references indicate that a hard metal, such as boron, may be placed next to the substrate, i.e., not necessarily a soft layer.

In addition, one of ordinary skill in the art would not have been motivated to incorporate the alleged teachings of Brandle regarding alternating layers since Setoyama and Kukino focus on the formation of crystal structures. The alternating layers have specific crystalline structure requirements and thus, cannot readily be substituted with the Brandle coating layers. For example, Brandle discloses the incorporation of compounds of titanium and aluminum in the first layer and compounds of chromium, tantalum, zirconium, or titanium in the second coating layer. At 1 atm and 25°C, titanium, aluminum, chromium, and tantalum have a cubic crystal structure. Thus, the Setoyama and Kukino second layers cannot be substituted with the Brandle second coating layer without impermissibly modifying the teachings of Setoyama and Kukino. In the absence of an incentive, motivation, or suggestion to combine the references, the applied art does not establish a *prima facie* basis for rejection under 35 U.S.C. §103(a).

Moreover, in the claimed hard multilayer coating, the arrangement of layers requires that the innermost and outermost layers are first coating layers which are harder than second

coating layers. Brandle discloses a multilayer coating, but the softer second layer (or optional third soft metal layer) is the innermost layer. Thus, one reviewing the primary references in view of Brandle would add a softer layer next to the substrate. This is not the claimed invention. In the absence of a likelihood of success in obtaining the claimed invention, the applied art does not establish a *prima facie* basis for rejection under 35 U.S.C. §103(a).

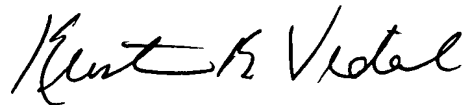
Applicant respectfully requests reconsideration and withdrawal of the rejection.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 3, 4, 9, and 11 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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